

PPollution Prevention Progress Report



U.S. Department of Energy ■ June 1998

Albuquerque Operations Office

Kansas City Plant (KCP)

AlliedSignal was using a labor-intensive chemical stripping process to remove mold release from tooling. Due to the corrosive chemicals used, process waste could not be treated at the site's Industrial Wastewater Pretreatment Facility. AlliedSignal switched to a new process that removes mold release by abrasion with plastic beads. The new equipment reduces the time needed to clean the molds; and, having eliminated the hazardous waste stream, the process is now safer. This source reduction project reduced hazardous waste by 0.341 metric tons, and saved \$5,000.

Los Alamos National Laboratory (LANL)

An Environmental Restoration project at TA-33 used the Segmented Gate System (SGS) in conjunction with containerized vat leaching to segregate soils. With SGS, soils move along a conveyor belt and are scanned and segregated as clean or contaminated. This segregation project reduced low-level waste by over four cubic meters, and saved \$667,816.

A DOE Headquarters-funded High Return-on-Investment (ROI) project evaluated waste metals exiting Radiological Control Areas for the best waste management/waste minimization procedure. Algorithms to determine the most

cost-effective management path were developed for this project. Possible pathways included verification of "clean" and free-release, decontamination and free-release, or shipment to the radioactive smelter. This recycle/reuse project reduced low-level waste by 31.4 cubic meters, and saved \$52,421.

Hazardous materials (such as, solvents, copper chloride solution, ion exchange resins, acids, batteries, capacitors, ballasts, and gas cylinders) from various locations throughout the site are sent offsite to be recycled. This project reduced hazardous waste by 10.71 metric tons, and saved \$62,606.

Concrete rubble and soils from various construction/demolition projects at LANL are trucked separately to the county landfill throughout the year. The landfill uses the rubble in a land bridge used to span a canyon. This recycle/reuse project reduced sanitary waste by 1,148 metric tons, and saved \$154,443.

Pantex Plant

Dolomite installation on Weapons and Tactics Training Facility (WTF) berms: this project evaluated the difference in total life cycle cost of two alternative methods for building four firing ranges at the new WTF for the Pantex Guard Force and DOE's Transportation and Security Division personnel at Pantex.

The first method is one of the oldest and least expensive for constructing small arms firing ranges. This method utilizes earth-only for constructing the side and backstop berms used to contain the fired bullets, as well as for the range floors. Although the initial capital expense is small, this method is associated with an extremely high cost of cleanup for lead-contaminated soil.

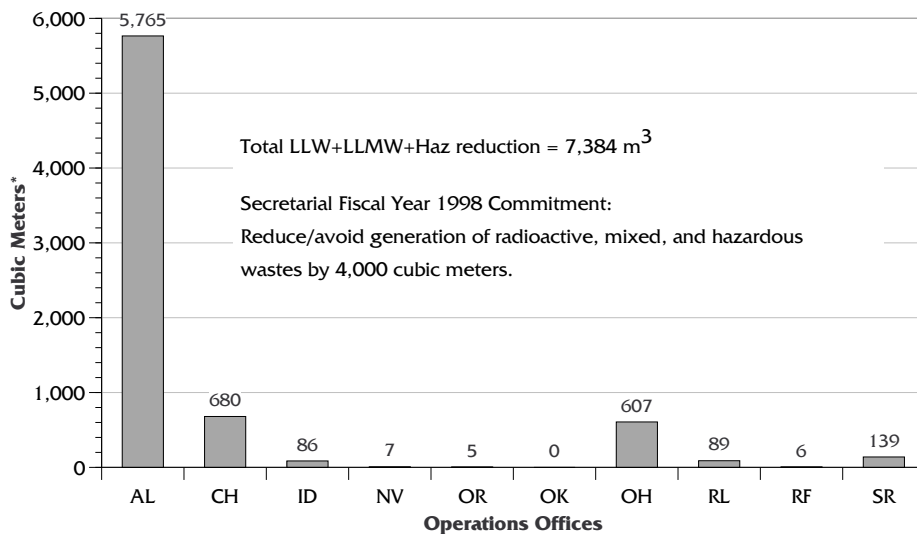
The second method utilizes a layer of dolomite screenings on the earth-only berms and range floors to contain the fired bullets. Although the initial capital expense is greater, this method minimizes pollution because the dolomite screening layer is alkaline, and the method for leaching lead requires the presence of acid. Dolomite screenings may also be sent out to a lead smelter; when the dolomite is used as a fluxing agent in furnaces, the lead and other metals will be recovered. Because the dolomite does not meet the

PP Quarterly Facts

Jan. 98 – Mar. 98

- 178 pollution prevention projects completed.
- 7,384 cubic meters of radioactive, mixed, and hazardous waste reduction.
- \$53 million estimated annual waste avoidance savings.

**Radioactive, Mixed, and Hazardous Waste Reductions
for All Operations Offices
(January 1998 – March 1998)**



*Assuming one cubic meter is equivalent to one metric ton.

smelter's specifications for a fluxing agent, it will have to be mixed with other fluxing agents. If the smelter can use the bullets in the mixture as ore stock in their process, this would greatly reduce the cost of disposal, which, in the long run, is much less expensive.

Originally, the earth-only construction method was site funded. Pantex then received ROI funding to install the layer of dolomite screenings on the earth-only berms and range floors. This project will eliminate a total of 15,610 metric tons of lead-contaminated soil waste during maintenance and the final decommissioning of the WTTF. Over a period of 10 years, this recycle/reuse project will reduce hazardous waste by 5,203 metric tons, and save \$9,793,500.

Sandia National Laboratory (SNL)

A wastewater recycler collection system and storage tank was installed at the Microelectronics Development Laboratory. Monitoring of the collected water is ongoing to determine the feasibility of various reclamation

and recycling options. It is estimated that this recycle/reuse project will reduce sanitary waste by 37,850 metric tons annually, and save \$15,271.

Chicago Operations Office

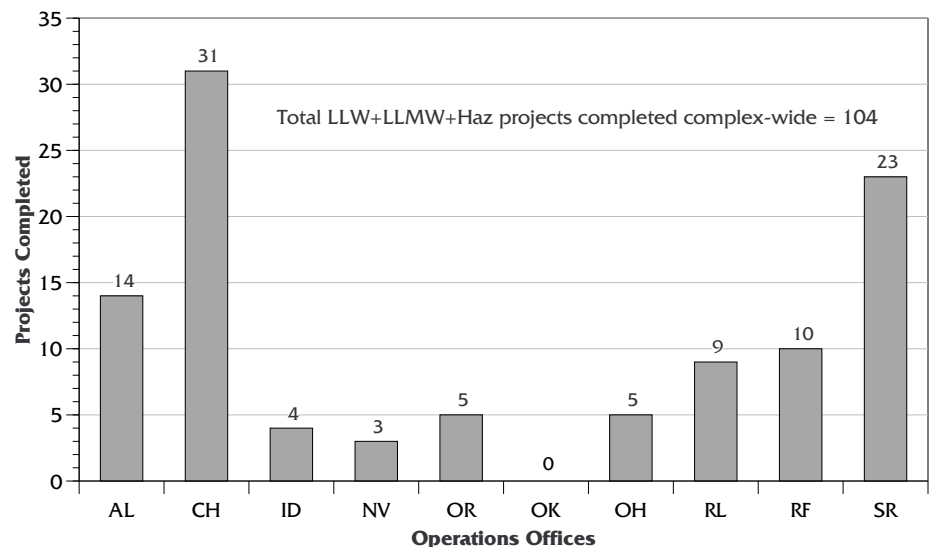
Argonne National Laboratory-East (ANL-E)

Under new Illinois Environmental Protection Agency

regulations, the fly ash waste stream generated from coal combustion at the boiler house was certified as nonspecial waste in January. Prior to this, the waste was designated as nonhazardous special waste. With the nonspecial waste designation, the fly ash waste no longer requires a manifest for shipping purposes; and, it does not have to be included in the *Annual Report* as a State-regulated hazardous waste. As a result of this change, the disposal vendor has reduced the cost of disposal by \$4 per cubic yard. This source reduction project reduced hazardous waste by over 80 metric tons, and saved \$750.

In conjunction with this, ANL-E also established a contract with American Fly Ash to recycle the fly ash generated at the Laboratory's coal burning boiler house. This agreement will reduce fly ash disposal costs by 50 percent, and will divert large volumes of material from the Laboratory's waste stream. Environmental Management Operations personnel have worked with

**Completed Projects for Radioactive, Mixed, and Hazardous Wastes
for All Operations Offices
(January 1998 – March 1998)**



Commonwealth Edison since January 1997 to establish this outlet for the Laboratory's fly ash. This recycle/reuse project reduced sanitary waste by 135 metric tons, and saved \$3,600.

Argonne construction and demolition (C&D) projects recycled approximately 240,000 pounds of material during this quarter. The material recycled amounted to approximately 39.2 percent of the C&D waste stream. This recycle/reuse project reduced sanitary waste by 105 metric tons, and saved \$3,500.

The Plant Facilities and Services-Utility Systems established a contract to sell its coal fines for recycling. The revenues generated from the sale of the coal fines totaled \$5,680. This recycle/reuse project reduced hazardous waste by 421 metric tons, and saved \$19,050 in disposal costs.

Argonne National Laboratory-West (ANL-W)

In the Electron Microscopy Laboratory, a new facility just coming online, a project was undertaken to reuse a radiologically contaminated High Efficiency Particulate Air (HEPA) filter housing removed during the Analytical Laboratory upgrades. This eliminated the disposal of the used HEPA filter housing as low-level waste and eliminated the purchase of new HEPA filter housings. This recycle/reuse activity reduced low-level waste by 27.18 cubic meters, and saved \$21,000.

HEPA filters were also installed on the inlet and outlet of a vacuum pump to prevent the vacuum pump oil from becoming radioactively contaminated, a

source reduction project that reduced low-level waste and saved \$1,500. In addition, a radioactive liquid particulate filter and recirculation system was installed to minimize the generation of radioactive liquid waste. This source reduction project reduced low-level waste by six cubic meters, and saved \$15,000.

An acid neutralization system in the Analytical Laboratory created a potential mixed waste situation. Taking a waste minimization approach, a method was developed to filter the hazardous constituent, mercury, rendering the liquid waste generated as nonhazardous. Potential mixed waste was reduced from 250 gallons to six gallons. This source reduction project reduced mixed low-level waste by almost one cubic meter, and saved \$2,500.

Brookhaven National Laboratory (BNL)

BNL is in the process of performing Resource Conservation and Recovery Act (RCRA) closure of the old hazardous waste management facility. As part of that project, all mixed wastes were moved to the newly constructed waste management facility. Before the waste was moved, a detailed review of all characterization data was performed. The review resulted in the re-characterization of several wastes as non-RCRA. They were subsequently determined to be radioactive non-mixed wastes, and were segregated, treated, and disposed. Approximately 400 gallons of waste were recharacterized. This segregation project reduced mixed low-level waste by 1.5 cubic meters, and saved \$40,000.

Princeton Plasma Physics Laboratory (PPPL)

Routine recycling of electronic and computer scraps, batteries (including lead acid batteries from building emergency lighting systems), and crushed fluorescent T12 lamps (with a concentration of >0.2 milligram per liter of mercury) reduced hazardous waste by 27 metric tons, and saved \$25,631.

Boron frit, a concrete additive, will be reused (rather than disposed) in the decontamination and decommissioning effort for the Tokamak Fusion Test Reactor at PPPL. This recycle/reuse project reduced hazardous waste by three metric tons, and saved \$13,000.

Idaho Operations Office Idaho National Engineering & Environmental Laboratory (INEEL)

RCRA materials, including lead scrap, lead acid batteries, RCRA scrap, and silver scrap, were recycled. This reduced hazardous waste by 83 metric tons, and saved \$1,656,800.

Nevada Operations Office Nevada Test Site (NTS)

A material and chemical exchange project facilitated the transfer of kerosene, destined for disposal, to another department at NTS for reuse. This recycle/reuse project reduced hazardous waste by three metric tons, and saved \$34,632.

Scrap metals (including ferrous, nonferrous, light steel, and mixed steel), were sold. This recycle/reuse project reduced sanitary

Pollution **P**revention **R**ecognition

1998 DOE Pollution Prevention Awards Program Winners (by Category)

Affirmative Procurement

Pacific Northwest National Laboratory; Hanford Site, Richland, Washington:
Three Ingredients for Green Purchasing at the Pacific Northwest National Laboratory

Complex-Wide Achievement

Savannah River Site:
Utilizing Contract Incentives to Motivate Waste Reduction

Environmental Restoration

Oak Ridge Operations:
Passive Treatment System for the Chestnut Ridge Filled Coal Ash Pond

Information Sharing

Federal Energy Technology Center, Pittsburgh and Morgantown offices:
FETC's P2, Recycling, and Affirmative Procurement Activities: How We Spread the Message

Integrated Planning and Design

Savannah River Site:
Process Improvements to Eliminate Mixed Waste Generation From Off-Spec Heavy Water Purification

Leadership

Keith Stone, Savannah River Site:
Excellence in P2 Program Management Leadership at DOE-SR Operations Office

Most Improved Facility/Large

Pantex Plant: *A Model Facility for Pollution Prevention*

Most Improved Facility/Small

Albany Research Center:
Waste Reduction at the Albany Research Center

Public Outreach and Partnership

Hanford Site: *The DOE Pollution Prevention Program: Applications to Small Businesses*

Radioactive/Hazardous Waste Recycling

Nevada Operations Office, Bechtel Nevada:
Cotter Concentrate Project at the Nevada Test Site

Return-on-Investment

Pantex Plant: *Replacement of Corrosion Protection Coating System at Pantex*

Solid Waste Recycling

Sandia National Laboratories-New Mexico: *A Comprehensive Approach to Solid Waste Recycling at Sandia National Laboratories*

Zero Generation/Source Reduction

Pantex Plant: *Replacement of RCRA Hazardous Dissolution Solvent*

waste by 283 metric tons, and saved \$21,947.

North Las Vegas Facility (NLVF)

A material and chemical exchange project facilitated the return of two 55-gallon drums of Solvent 724, destined for disposal, to the vendor for reuse. This recycle/reuse project reduced hazardous waste by almost half a metric ton, and saved \$5,510.

East Tennessee Technology Park (ETTP), formerly known as the K-25 Site

Due to the decision to privatize the Technical Division on April 1, 1998, DOE announced that all out-of-date/excess chemicals in K-1004-C and K-1006 (two areas traditionally considered to be radioactively contaminated), needed to be disposed by March 31, 1998. In less than two weeks, Analytical Services Organization personnel assisted the Technical Division with establishing these areas as Nonradioactive Material Management Areas; and with completing all required paperwork to get these chemicals shipped to Laidlaw for disposal. This project avoided indefinite storage of the chemicals at ETTP as low-level waste and mixed low-level waste, and also avoided the associated nondestructive assay tests and uranium samples. This segregation project reduced mixed low-level waste by almost one cubic meter, and saved \$13,876.

Oak Ridge National Laboratory (ORNL)

Several glove boxes in the Chemical and Analytical Sciences Division (CASD) Transuranic Research Laboratory use oil diffusion systems to ensure an inert atmosphere for work with transuranic (TRU) Isotopes. CASD

replaced three oil-lubricated vacuum pumps used to evacuate antechambers on TRU-contaminated glove boxes with dry pumps, which eliminate the TRU-contaminated waste oil stream. The former pumps generated almost 20 liters per year of TRU-contaminated oil, and frequently leaked oil, which required contamination rags, solvents, and related materials for remediation. In addition, maintenance procedures presented the potential for personal exposure to contamination and/or radiation, and ongoing research activities were interrupted. This source reduction project reduced transuranic waste by less than one cubic meter, and saved \$11,658.

The traditional QS-1 Enhanced Mercury Analyzer for Scientific Measurements analyzes mercury in various sample matrices. It required 20 milliliters per sample for proper uptake, which generated approximately four-to-five liters of RCRA waste per batch of samples. This unit was replaced by a new M-6000A Mercury Analyzer that requires only 10 milliliters per sample, reducing waste by 50 percent. Operating time and manpower are also reduced by 50 percent due to less potential for sample carry-over and/or contamination. This source reduction project reduced hazardous waste by one tenth of a metric ton, and saved \$26,296.

Oakland Operations Office

Oakland Operations advertised a need for B-25 containers for disposal of low-level waste from the Laboratory for Energy-Related Health Research (LEHR) at Hanford. The Savannah River Site

responded, and offered as many containers as needed for the cost of transportation. New B-25 containers cost \$700, and transportation of a used container costs \$300. LEHR needs 200 containers currently, and may need as many as 450 additional containers in the future. The initial cost savings for Oakland and the LEHR Environmental Restoration and Deactivation and Decommissioning (D&D) Project for the first 200 containers is \$80,000.

Lawrence Livermore National Laboratory (LLNL)

LLNL is expanding its implementation of the SmartWasher (a bioremediative aqueous parts washer) after the successful use of nine units that were delivered in early 1998. Use of the SmartWasher has reduced the generation of solvent waste.

Ohio Field Office

Battelle Columbus Laboratories

Approximately 14,650 cubic feet of soil, water, and hard trash were segregated, characterized, and radiologically free-released for municipal disposal. This segregation project reduced low-level waste by 415 cubic meters, and saved \$259,350.

Waste generated from the removal of contaminated drain lines was segregated and characterized. This segregation project reduced mixed low-level waste by seven cubic meters, and saved \$272,000.

Approximately 3,780 cubic feet of concrete slab was segregated, characterized, and radiologically free-released. It was then sent to a vendor for crushing into aggregate for reuse as road base

material. This recycle/reuse project reduced low-level waste by 106 cubic meters, and saved \$87,378.

Richland Operations Office

Hanford Site

Excess bulk lead bricks, sheets, and other materials were collected and sent to an offsite recycler. This recycle/reuse project reduced hazardous waste by 113.01 metric tons, and saved \$178,562.

Lead-acid batteries were shipped offsite for recycling. This recycle/reuse project reduced hazardous waste by 21 metric tons, and saved \$6,900.

Return-on-Investment funded the isolation of a 151-Diversion Box to prevent seepage of precipitation into the structure. This source reduction project reduced mixed low-level waste by 12 cubic meters, and saved \$28,255.

Radiologically Contaminated Areas (RCAs) were effectively cleaned to lower levels due to excellent operating practices. Cleaning these areas facilitated access for personnel and also reduced resource requirements. Both personal protective equipment (PPE) needed for entry and the contaminated PPE and equipment requiring disposal have been reduced. This source reduction project reduced low-level waste by over 87 cubic meters, and saved \$2,000.

A high-pressure spray wand was placed inside 340-A tanks containing mixed transuranic sludge to manually stir the sludge with several feet of water. After a proper mix was achieved, the bottom drain was opened to drain

Acronyms

CASD	Chemical and Analytical Sciences Division
C&D	Construction and Demolition
D&D	Deactivation and Decommissioning
DWPF	Defense Waste Processing Facility
HEPA	High Efficiency Particulate Air
LEHR	Laboratory for Energy-Related Health Research
P2	Pollution Prevention
PPE	Personal Protective Equipment
RCA	Radiologically Contaminated Area
RCRA	Resource Conservation and Recovery Act
ROI	Return-on-Investment
SGS	Segmented Gate System
TFTR	Tokamak Fusion Test Reactor
TRU	Transuranic Waste
WTF	Weapons and Tactics Training Facility

the mixed contents to 340 vault tanks for transfer to railcar. The spray wand was cleaned in-tank by a specially fabricated apparatus, enabling removal and reuse in other tanks. This source reduction project reduced transuranic waste by 0.6 cubic meters, and saved \$16,000.

Resin was redeployed for use onsite. This recycle/reuse project reduced hazardous waste by over five metric tons, and saved \$12,320.

CFC-12 refrigerant was removed from two of eight chillers at the site, and was sold to a vendor for reuse. The CFC-12 was replaced with a CFC-free refrigerant, HFC-134a. This source reduction project reduced hazardous waste by 16.5 metric tons, and saved \$17,000.

Pacific Northwest National Laboratory (PNNL)

The occasional urgent need for data from geochemical research forced the analysis of "cold" samples on the ion chromatograph system dedicated for radio-labeled samples. The purchase of an autosampler for the existing "cold" ion chromatograph keeps the radioactive and nonradioactive waste streams separate, and allows the "cold" sample waste to be disposed to the sanitary sewer. This segregation project reduced low-level waste by less than one cubic meter, and saved \$15,600.

Formalin, alcohol, xylene, and methanol were distilled and reused. This recycle/reuse project reduced hazardous waste by half a metric ton, and saved \$5,000.

Rocky Flats Field Office

Stainless steel, copper, iron, and aluminum were recycled from D&D activities. This recycle/reuse project reduced sanitary waste by 100 metric tons, and saved \$5,875.

A chemical life-cycle/chemical dispensary program finds end-users for chemicals not needed onsite or sells them offsite. This recycle/reuse project reduced hazardous waste by more than one metric ton, and saved \$19,855.

Savannah River Operations Office

Fifteen RCA rollbacks were completed, avoiding generation of low-level waste and laundry. These source reduction projects reduced low-level waste by 866 cubic meters, and saved \$854,833.

Stainless steel radioactive scrap metal that would normally be declared low-level waste and disposed in the E-Area Vaults was fabricated into shielding bricks for use at SRS, saving 440 cubic feet of Vault space. This recycle/reuse project reduced low-level waste by over 92 cubic meters, and saved \$10,240.

The Defense Waste Processing Facility (DWPF) 221-S Laboratory implemented a process change in routine lab operations to reduce low-level waste generation. The new method uses disposable transfer draw liners to reduce the frequency/need for decontaminating transfer draws, and to eliminate the reprocessing of "clean waste" that may become contaminated from the use of the transfer draws. This source reduction project reduced low-level waste by over 39 cubic meters, and saved \$17,962.

The DWPF 221-S Laboratory also implemented a project to recycle and reuse manipulator fingers. This recycle/reuse project reduced low-level waste by more than four cubic meters, and saved \$97,750. In addition, the DWPF 221-S Laboratory implemented a project to reuse latex gloves for radio bench and hood work. This recycle/reuse project reduced low-level waste by 26 cubic meters, and saved \$5,612.

